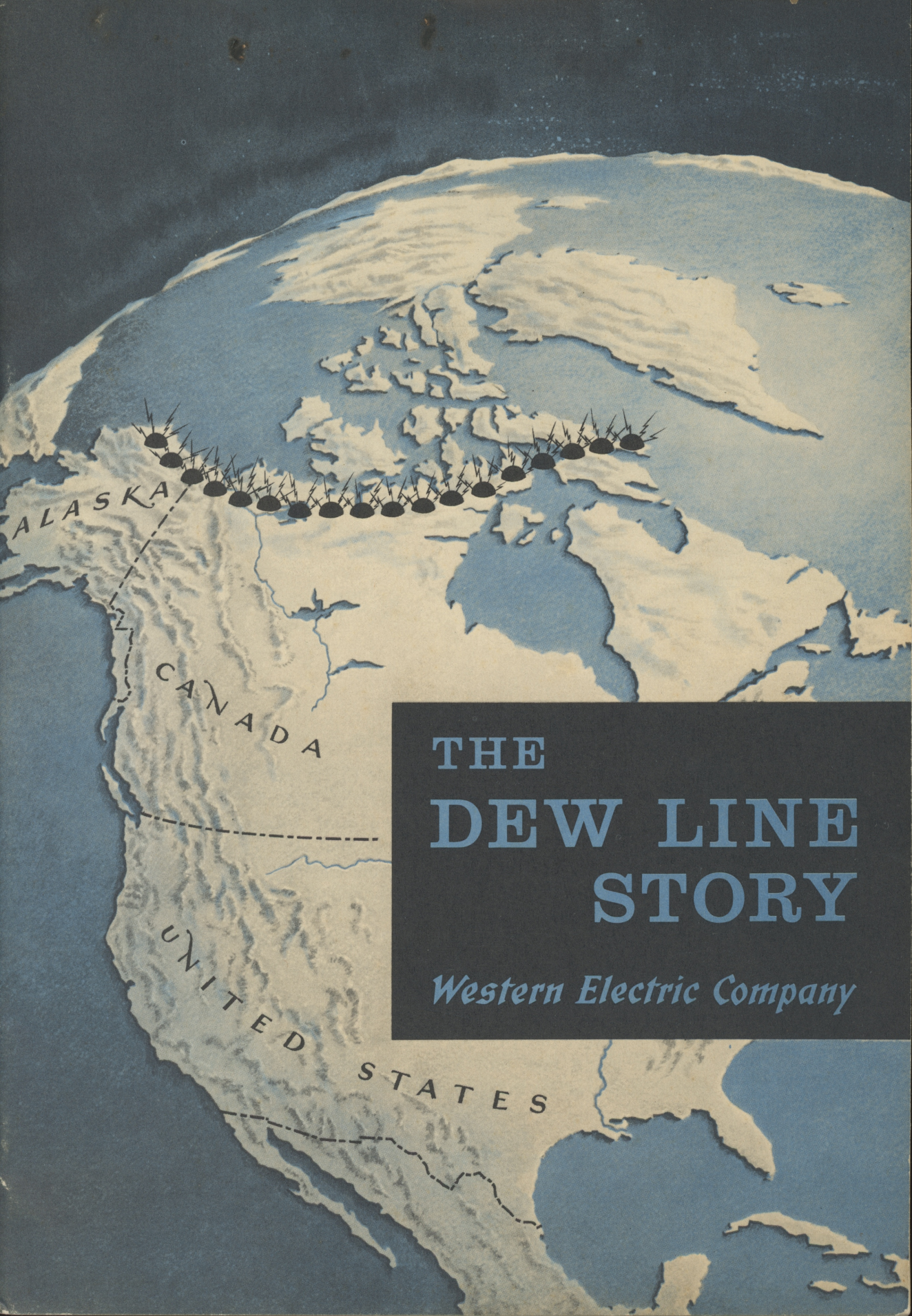


THE DEW LINE STORY

Western Electric Company

THE DEW

Six Hours from the Arctic

The frozen lands beyond the Arctic Circle seem so remote, so forbidding, so far removed from the everyday patterns of our lives, that they could be on another planet as far as most of us in the United States are concerned. Yet, as the jet bomber flies, the shores of the Arctic Ocean are only four to six hours from Chicago, Cleveland, Detroit, New York—from any of the great industrial centers of the Midwest and East.

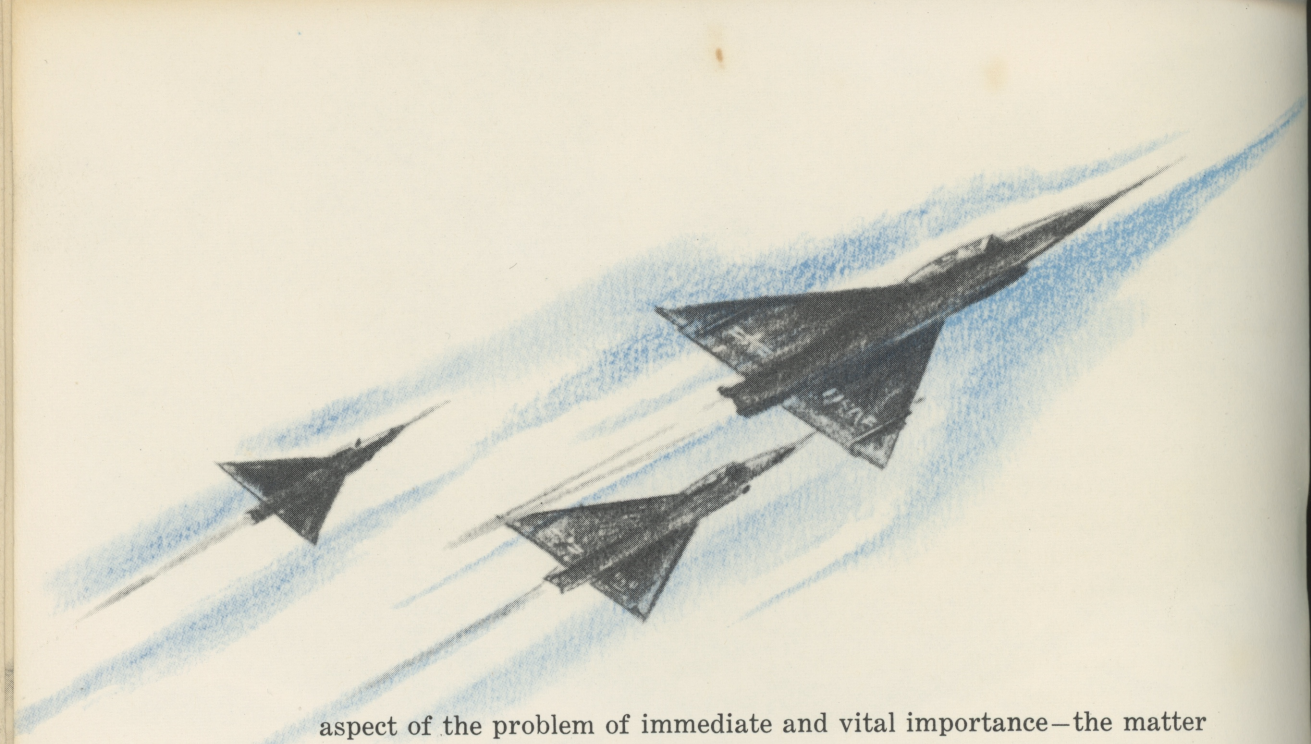
This fact held special significance for certain distinguished scientists (for security reasons they were called the "Summer Study Group") gathered in the Lincoln Laboratories of Massachusetts Institute of Technology in the summer of 1952. Of even greater import was the further fact that the shortest distance which possible enemy bombers might take into America's industrial heart was a "great circle" course across the Arctic and down over the wilderness of central

LINE STORY

Canada; if an enemy attack were to come from this direction, we would have but a few minutes warning before they arrived over their targets.

This information was of special concern to this group of scientists because M.I.T.'s Lincoln Laboratory, operating under a contract with the U. S. Air Force, had been asked to draw upon America's best scientific minds to seek the answer to a single, all important question. Stark in its simplicity, awesome in its implications, that question was: "What steps must be taken so that America can be safe from an atomic attack by high-speed bombers?"

This was not a question which would yield to any single, simple answer, the scientists knew. Many factors would have to be considered, many elements brought into play, if our defenses were to be formidable enough to discourage, or repel a possible attack. But there was one



aspect of the problem of immediate and vital importance—the matter of early warning. We needed every hour, every minute possible, to get interceptor planes into the air and maneuvered, to alert anti-aircraft defenses, and to allow civilian populations to take cover.

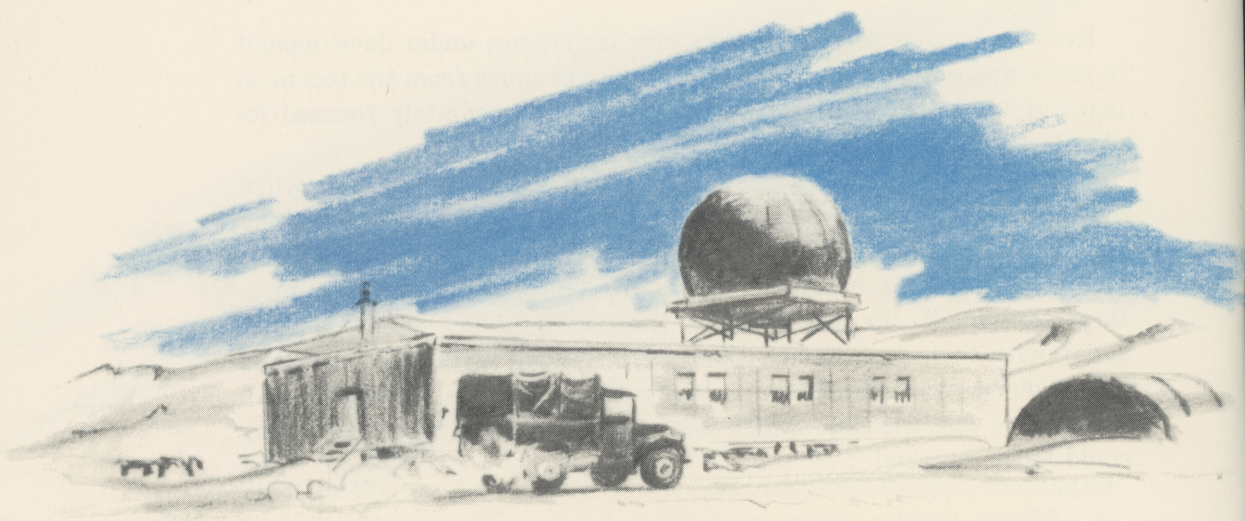
Early Warning Needed

It was this problem of early warning that the Lincoln Laboratories' "Summer Study Group" had been asked to ponder. During those days in 1952, the group turned its collective thoughts constantly northward. If, they reasoned, it were possible to establish a warning system that would give us the advantage of those four to six hours flying time from the Arctic, it might swing the balance in favor of our defenses in the event of an attack. To gain this time we needed a chain of radar stations across the Arctic—and we needed them as soon as possible. Thus it was that the basic concept of the Distant Early Warning Line came into being.

Coming to this conclusion and putting the idea into practical operation were two vastly different matters. Needed, first of all were types of radar, radio and other communications equipment which could pierce the severe electrical storms which sweep across the Arctic and knock out conventional communications. Needed too, was equipment which would function with a minimum of human attention. In other words, this warning system would require equipment which at that time simply did not exist.

But there was hope. There were new techniques under development in radar and communications which offered promise from the technical point of view. The "Summer Study Group" immediately focused its attention on these.

Thus it was on those quiet summer days several years ago, when most people were on vacation or dreaming of the mountains and beaches, that the Lincoln Laboratory, working closely with Bell Telephone Laboratories, set about developing and modifying communications equipment, literally building the prototypes of a new type of radar with their own hands. The intensity with which they attacked this problem was stimulated by more than the usual scientific zeal. They knew that the time might come when the work they were doing could mean survival. . . .



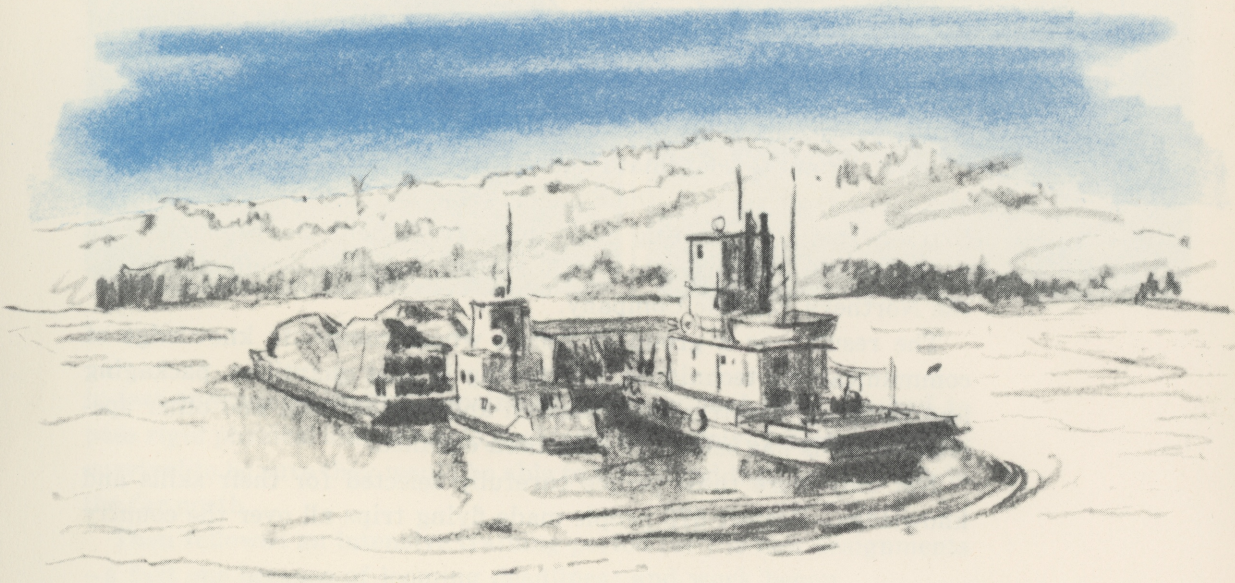
The Experimental Line

It was in December, 1952, that what was to be known as "Project 572" (code name for the DEW Line project) was born. Earlier that year, the "Summer Study Group" of scientists at M.I.T. had made their proposal to the U. S. Department of Defense that an early warning radar line be built across the North American Arctic. The Department of Defense decided that a trial installation should be made consisting of one segment of a distant-early-warning line. If this were successful, the rest of the Line would follow.

It was then that Bell System officials were asked by the U. S. Air Force to take over the experimental project. Specifically, we were asked to undertake the full responsibility for engineering, construction, installation and operation of a chain of radar and communications stations on Alaska's northern coast—and have them functioning within a year!

It was also proposed that we, "make preliminary surveys of a route across the Arctic, assess the logistic and construction problems involved in creating the complete line, and develop techniques for their solution." The Bell System accepted the proposal and Western Electric was assigned the job.

All in all, this was one of the most unusual, difficult and challenging assignments Western Electric and the rest of the Bell System had ever undertaken. It meant, for one thing, that we would have to install and test new electronic and communication techniques under actual Arctic conditions. It also meant that every board and nail, every ounce of food and fuel, everything needed to support a group of men living and working in the Arctic, plus a staggering array of heavy construction machinery and, of course, the electronic equipment itself, would have to be planned for, purchased, assembled at shipping points, transported to utterly barren and uninhabited locations in the Arctic and there assembled and put into operation.



One year was the deadline they gave us, but there were even more stringent deadlines imposed by weather conditions in the far north. For example, only for a few weeks in late summer is the Arctic Ocean free enough of ice for ships to get through. To a great extent the success of the project depended on getting most of the materials needed aboard ships in time for arrival in the north during these few weeks. Meanwhile, there was a staggering preliminary job to be done.

Why the Bell System?

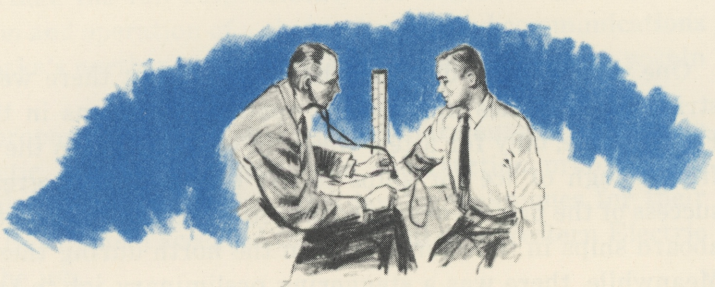
It was because of the very complexity and size of the undertaking, because of the special problems involved as far as the new types of equipment were concerned, that the Bell System was chosen to handle this project in the first place. The Research and Development Command of the Air Force stated it this way in asking the System to accept the responsibility: "The Bell System with its integrated development, manufacture, supply and operating units appears to be uniquely qualified to assure the success of a project which is of the highest urgency and importance to the defense of the Country."

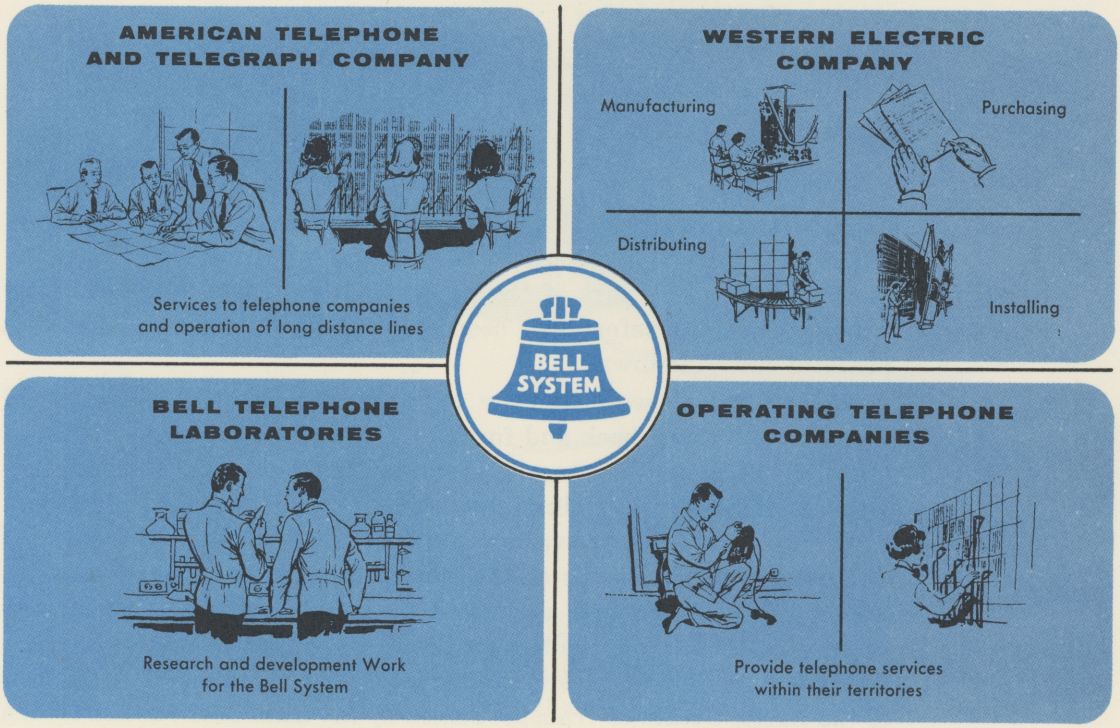
In other words, it was because of the Bell System's enormous reservoir of skills and experience; because of the very factors which make the Bell System itself a successful, smooth-functioning, integrated operation, that we were considered best suited for a job of this kind.

To get the job done, Western Electric immediately drew upon the Bell System's most valuable resource—trained manpower—to organize a special group to coordinate and manage the project. This team was assembled from all over the System; from Western Electric itself, of course, from 17 operating companies, from Bell Laboratories, from the Long Lines Department of A.T.&T. and from our Canadian affiliate, the Northern Electric Company.

The result was a group of people whose composite knowledge of communications techniques, purchasing in vast quantities, packaging and shipping, construction, research and engineering, and other specialized skills has seldom if ever been equalled.

Not only were these people carefully selected for their skills and knowledge—Project 572 people made flying trips all over the country





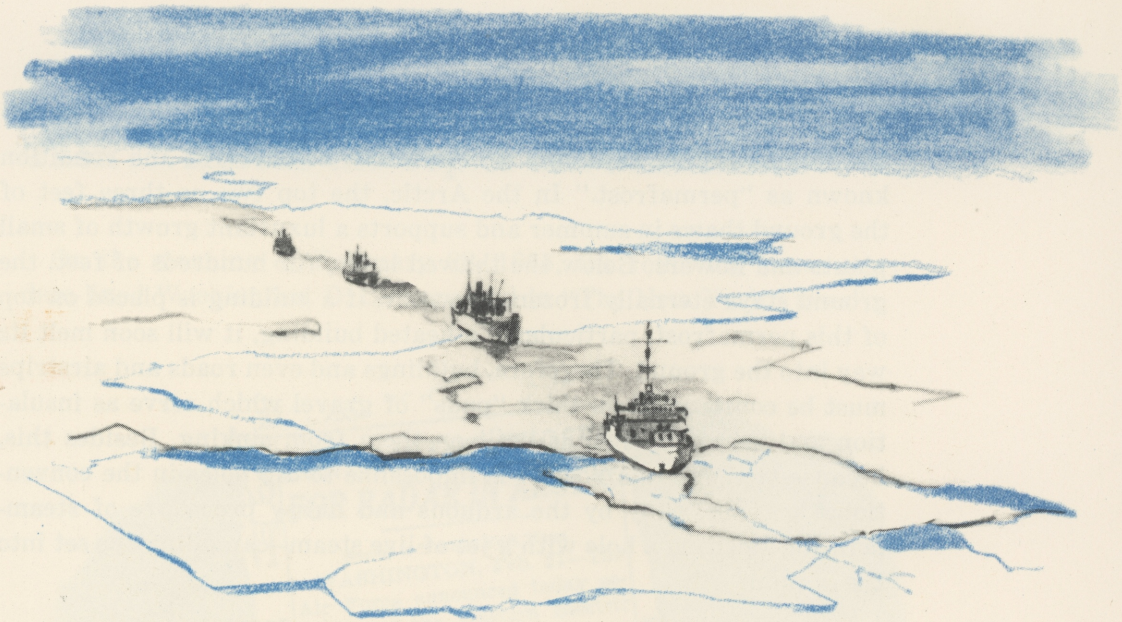
to test and interview new appointees carefully—but they also had to pass rigid physical and psychological tests and receive lessons in Arctic survival to be sure they would be able to withstand the rigors of life in the far north.

Then followed an intensive training period for the new assignments—a fast one because of looming deadlines; and work began.

At the beginning of Project 572, some of the men newly assigned to it seemed to disappear for a while, almost as if the Arctic swallowed them up. When the magnitude of the job they were working on is considered, this isn't surprising—they just didn't have time for anything but the urgent matters at hand. Some of them were soon living in northern Alaska on the shores of the Arctic Ocean. "Home" to them was a tent or a Jamesway hut, often in a place so desolate and windswept, so profoundly cold that no one, not even the Eskimos, had lived there in winter before.

Encounters with polar bears and wolves, with vicious Arctic winds, with "ice fog" and "whiteouts," and with water scarcity when the lakes froze solid, became part of the everyday life of men who but a few weeks or months before had been engaged in quite different jobs in peaceful stateside towns.

Still other men were literally commuting between the Arctic and the U. S., shuttling back and forth by any and every means of transportation at hand—commercial airlines, Air Force and Navy planes, "bush pilots" and "cat trains" (boxcar-like "wanigans" on sled runners hauled by giant tractors over ice and tundra). Still others were deeply absorbed by the demands of the stateside part of the job. Materials had to be purchased and assembled from hundreds of suppliers and sub-contractors; plans had to be made to fly preliminary materials over the rugged Brooks Mountain range into the sites on the shores of the Arctic Ocean, or transport them by cat train over ice and frozen tundra; preparations had to be made for the vast convoy of Navy ships which would carry the bulk of the supplies and equipment some thousands of sea miles from west coast ports to the sites when summer came.



Arctic Beachhead

Preparations for establishing the experimental sector of the DEW Line might best be compared to mobilization for one of the major beachhead invasions in World War II. In the DEW Line job, as in the military venture, painstaking advance planning was essential. An item overlooked, something which didn't get to the right place at the right time could make the difference between success and disaster. Timing, too, was all important in both types of operation. The "offensive" had to be launched on a carefully planned schedule. In the case of the DEW Line, the "enemy" was ice. Departures of ships had to be timed for arrival in the north during those few ice free weeks or the whole year's effort could be lost.

The logistical problem of getting materials to the northside was formidable enough. On top of this was a two-part construction job. One was the building of a typical DEW Line installation in the United States where personnel could be trained, and new communications and detection techniques and equipment pre-tested before being installed in the Arctic; the other was, of course, construction of sites in the Arctic itself.

Aside from the cold and the distance from sources of supply, the Arctic imposes certain peculiar obstacles of its own in the way of any

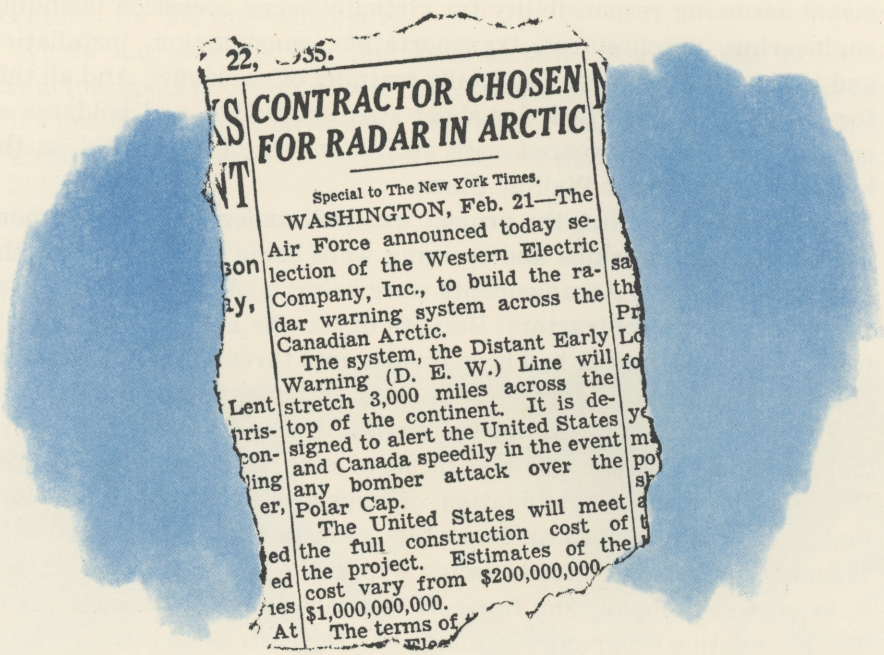
building program. One, and not the least of these, is the condition known as "permafrost." In the Arctic, the top two or three feet of the ground thaws in summer and supports a luxuriant growth of small plants and flowers. Below the thawed layer, for hundreds of feet, the ground stays eternally frozen. However, if a building is placed on top of this permafrost, particularly a heated building, it will soon melt its way into the ground. Therefore, buildings and even roads and airstrips must be constructed on thick "pads" of gravel which serve as insulation and keep whatever is built on them from sinking. Besides this, because of the permafrost, it is impossible to dig holes in the conventional manner. Only by the arduous and messy procedure of steam-pointing—melting a hole with a jet of live steam—can pilings be set into the ground.

In spite of all such problems, many of which couldn't be foreseen because no such project had ever been undertaken before, work sped ahead on schedule. By the time the snows came and the Arctic Ocean was once more locked in ice, clusters of low buildings could be seen in the wavering light cast by the Northern Lights. Above them were strange rubber domes, like the tops of silos or astronomical observatories, housing the radar antennas which would sweep the cold northern skies.

As the darkness of the long winter descended, the men of the DEW Line could take pride in the job which they had done. The deadline for the experimental line had been met.

Then . . . Across the Top of the Continent

On the morning of February 22, 1955, the following news story, date-lined Washington, D. C., appeared in "The New York Times":



22, 1955.

CONTRACTOR CHOSEN FOR RADAR IN ARCTIC

Special to The New York Times.

WASHINGTON, Feb. 21—The Air Force announced today selection of the Western Electric Company, Inc., to build the radar warning system across the Canadian Arctic.

The system, the Distant Early Warning (D. E. W.) Line will stretch 3,000 miles across the top of the continent. It is designed to alert the United States and Canada speedily in the event any bomber attack over the Polar Cap.

The United States will meet the full construction cost of the project. Estimates of the cost vary from $200,000,000 to $1,000,000,000.

The terms of

To the general public which knew little or nothing of the progress of Project 572's experimental line because of strict military security, this news story was the first positive indication that there was to be a DEW Line. To those behind the scenes it was hardly news. Nevertheless, it did have special significance because of what they could read between the lines. In the first place, to those "in the know" this story proclaimed that the experimental line had been successful–hence, the decision to proceed with a complete DEW Line "across the top of the continent. . . ." Implicit in this story, too, was the fact that Western Electric and the Bell System as a whole were now launched upon an undertaking that was simply staggering in its size and complexity. The

experimental phase of the project had been an enormous undertaking. It was dwarfed in comparison with what lay ahead.

It was in the late months of 1954 that the Department of Defense had notified Western Electric that an agreement had been reached between the U. S. and Canada to extend the DEW Line. W.E. was again asked to be prime contractor—and again it had accepted. This meant assuming responsibility for virtually every operation including engineering, procurement, transportation, construction, installation and testing of equipment and finally training of personnel. And all this for an undertaking which for sheer size, originality and boldness of concept has been compared with such wonders of the world as the building of the Great Wall of China.

Within three months, the project was well under way. Scores more people with special skills and training were being recruited from the entire Bell System. Arrangements were being made with hundreds of suppliers and subcontractors. Because of its size and the vast area it would cover, the project had been divided into three sectors. The actual construction work on each of these was assigned to a subcontractor.

The Alaskan sector was in the hands of the Puget Sound Bridge and Dredging Company of Seattle in a joint venture with Johnson, Drake and Piper—a combination of experienced construction firms that had already played an important part in the experimental line. The next or Western Canada sector was in the hands of the Northern Construction Company and James W. Stewart, Ltd., of Vancouver, B. C. The Foundation Company of Canada had the eastern sector.

Selecting the Route

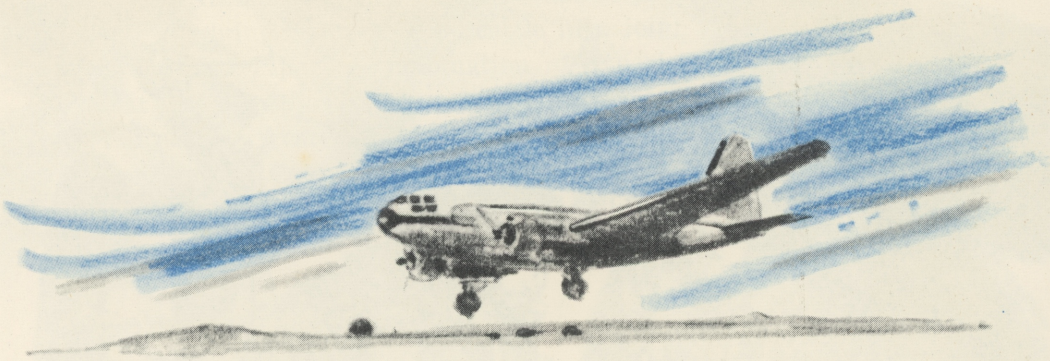
Also under way in the early months of 1955 was a tremendous engineering task—selecting the actual route along which the DEW Line sites would lie and selecting and laying out the sites themselves. It was important to get the line as far north as possible—the closer to the Pole the more warning in case of an attack. But transportation, construction, annual resupply problems and many technical factors also entered into the decision. The very geography, ranging from the flat tundra on the Alaskan end of the line to incredibly rugged mountains in the east, presented problems, too.

Before the final selection of a route was made, every available map of the American Arctic was studied, thousands of aerial photographs were taken and carefully examined, reports of previous Arctic exploration parties were studied. Every possible route was scouted by plane. Then, when the one route which held most promise from every point of view had been chosen, the next step began—the selection of the actual locations for the individual sites.

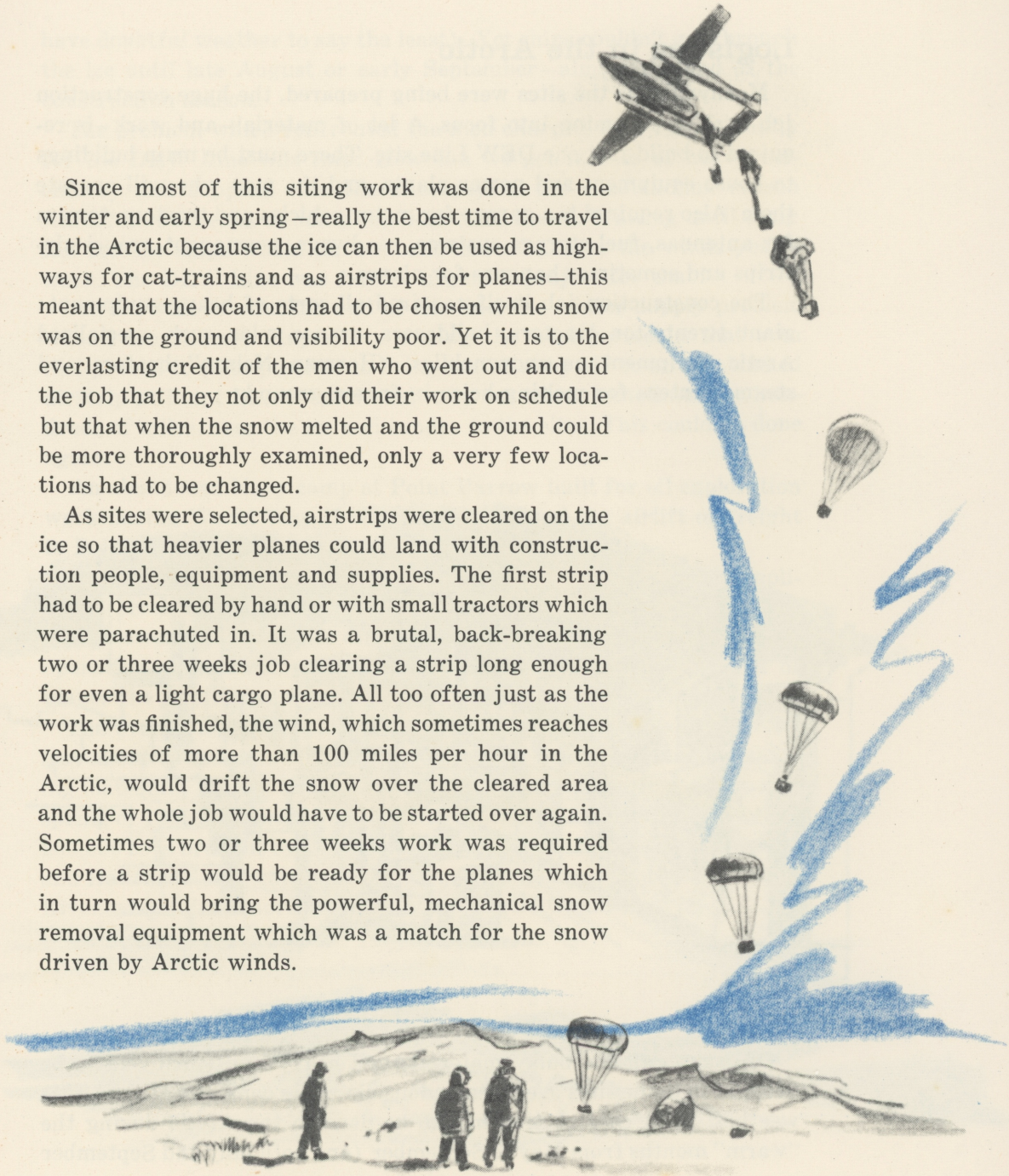
There was only one way this could be done. Someone had to go to the actual spots under study and make on-the-ground tests and surveys. This lonely and often hazardous assignment was undertaken by "field parties" of engineers from Western Electric and other Bell companies.

Selecting the Sites

Early in the project, while the winter cold and darkness still lay over the Arctic, these site selectors began their missions. Traveling sometimes by cat-train over the ice, more often by light plane, they went out into terrain that only a few migrant Eskimos had ever visited before; into places so little known that existing maps were sometimes incomplete or inaccurate and the site selectors had to make their own maps, giving names to capes and bays and islands as they went along.



Landing their planes as best they could between snow drifts and pressure ridges on the ice—"any landing you walk away from is a good one" is the site selector's motto—they would stake down their tents against the savage Arctic winds and go about making necessary electrical tests, surveying for landing strips and building locations, and searching for the gravel—or for rock that could be crushed into gravel—which in this land of permafrost is a necessity of life.



Since most of this siting work was done in the winter and early spring—really the best time to travel in the Arctic because the ice can then be used as highways for cat-trains and as airstrips for planes—this meant that the locations had to be chosen while snow was on the ground and visibility poor. Yet it is to the everlasting credit of the men who went out and did the job that they not only did their work on schedule but that when the snow melted and the ground could be more thoroughly examined, only a very few locations had to be changed.

As sites were selected, airstrips were cleared on the ice so that heavier planes could land with construction people, equipment and supplies. The first strip had to be cleared by hand or with small tractors which were parachuted in. It was a brutal, back-breaking two or three weeks job clearing a strip long enough for even a light cargo plane. All too often just as the work was finished, the wind, which sometimes reaches velocities of more than 100 miles per hour in the Arctic, would drift the snow over the cleared area and the whole job would have to be started over again. Sometimes two or three weeks work was required before a strip would be ready for the planes which in turn would bring the powerful, mechanical snow removal equipment which was a match for the snow driven by Arctic winds.

Logistics in the Arctic

Meanwhile, as the sites were being prepared, the huge construction job itself was coming into focus. A lot of material—and work—is required to build just one DEW Line site. There must be main buildings to house equipment and power plants, and the men who will operate them. Also required is a garage for motor vehicles and tractors, towers for antennas, fuel storage systems, roadways, permanent gravel airstrips and sometimes hangars for planes.

The construction job itself required all sorts of heavy equipment: giant twenty-ton tractors, bulldozers, cranes, plus such specialized Arctic equipment as snowmobiles, "Herman Nelson" heaters and steam-pointers for melting holes in frozen ground.

Of course, all the bulky materials and heavy equipment had to be brought in to the sites over tremendous distances complicated by Arctic weather. Most construction had to be done in the Arctic during the "warm" months from May to September (and both May and September

have doubtful weather to say the least). Yet ships couldn't get through the ice until late August or early September—almost the end of the construction season.

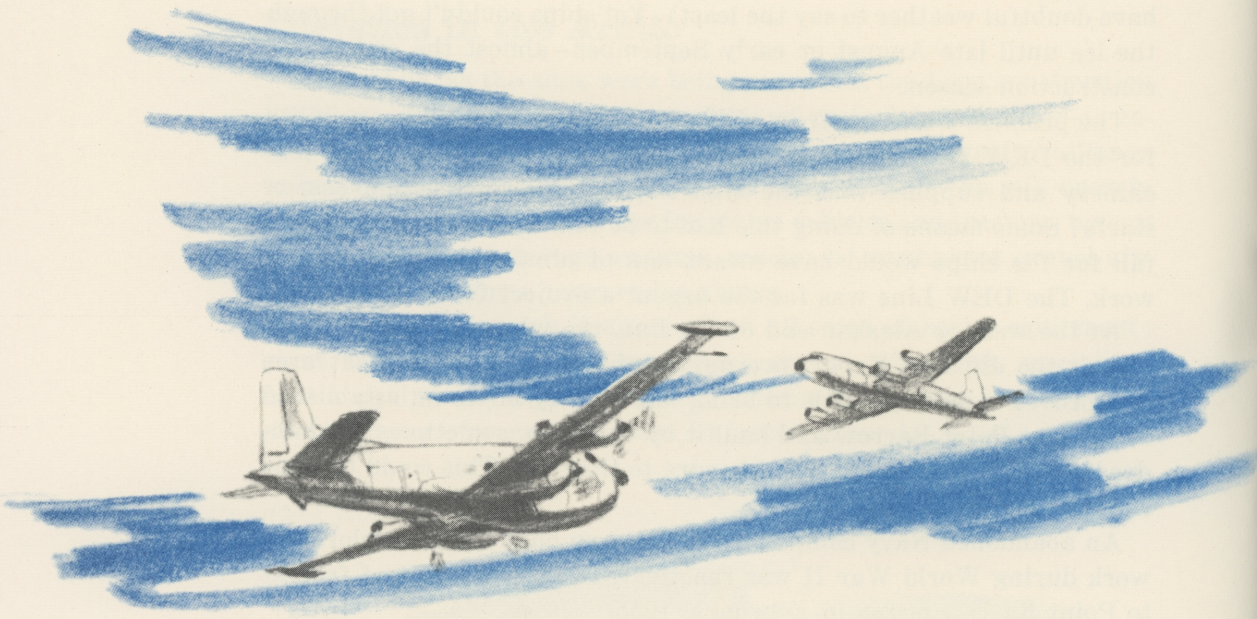
The problem which confronted the men charged with responsibility for the DEW Line was this: How can we get masses of heavy machinery and supplies into the sites *before* the construction season starts? Some means of doing this had to be found. Waiting until early fall for the ships would have meant loss of almost the whole year's work. The DEW Line was far too urgent a project for that!

At the west or Alaskan end of the line, the winter supply problem wasn't too difficult. Experience during the trial period in that area had proved it quite possible to bring material by air to an established airstrip at Point Barrow and haul it by cat-train, sometimes for hundreds of miles, over the ice and tundra to the sites. This could be done again.

An abandoned Navy camp at Point Barrow built for oil exploration work during World War II was reactivated and the airlift of freight to Point Barrow began in February, 1955.

On the Canadian part of the line, the situation was more complicated. Much of the country there was too rugged for cat-trains. The only answer was an airlift direct to the sites. It would have to be an operation of gigantic proportions involving the greatest armada of planes the Arctic had ever seen.

The overall logistical plan which was finally evolved called for the movement to the sites of some 30,000 *tons* of heavy machinery, building materials, fuel oil and other supplies by air during the winter and spring of 1955. This was to be followed in the late summer with another 200,000 tons brought by U. S. Navy convoys from Seattle, Washington, and Halifax, Nova Scotia; and by barge shipments down the Mackenzie River which flows northward into the Arctic Ocean.



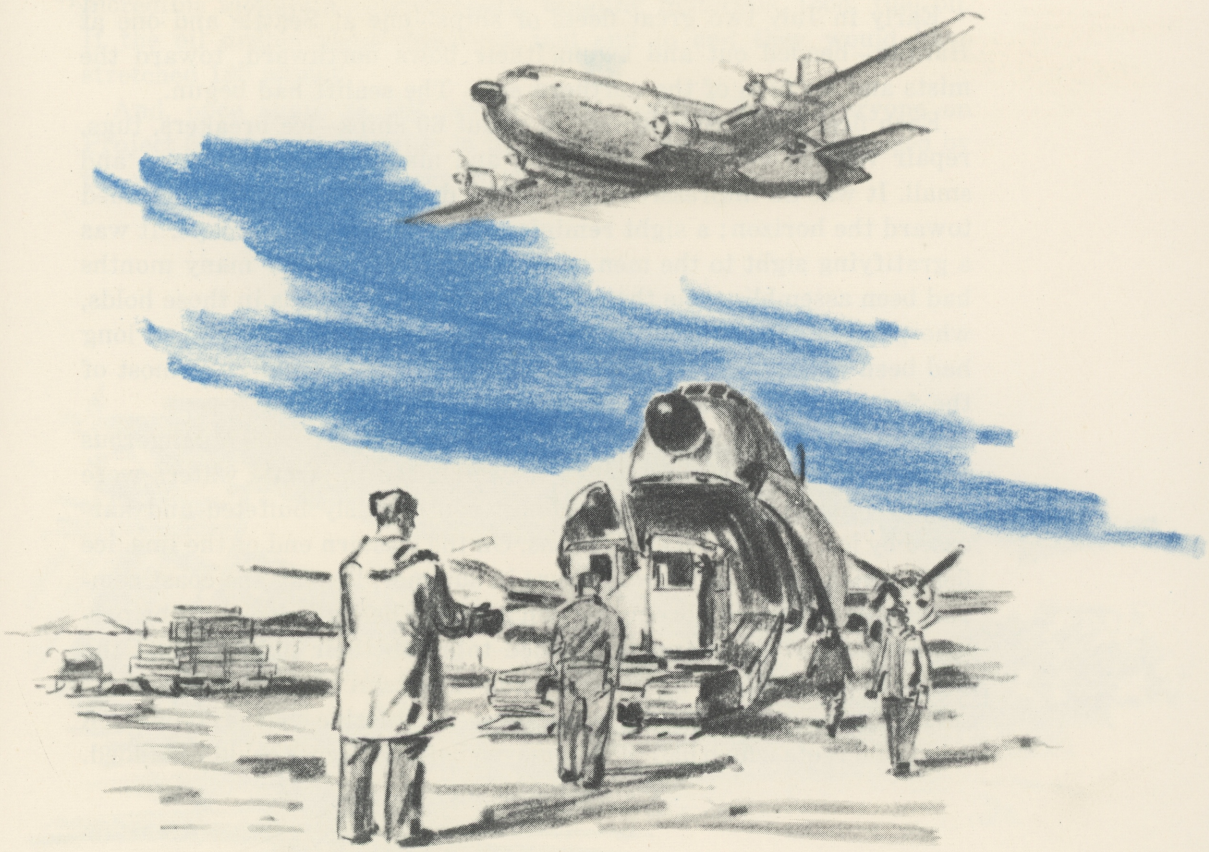
Supplies by Air

Everyone concerned expected the winter airlift to be a tough, grueling proposition—and it was. It involved the use of hundreds of aircraft of practically all types including giant C-124 Globemasters which, when loaded, weighed 90 tons apiece. These were needed to bring in the heavier items of construction equipment such as the 20-ton tractors. Yet planes that size had never been landed on ice before. How thick would the ice have to be? That was just one of many questions which had to be answered.

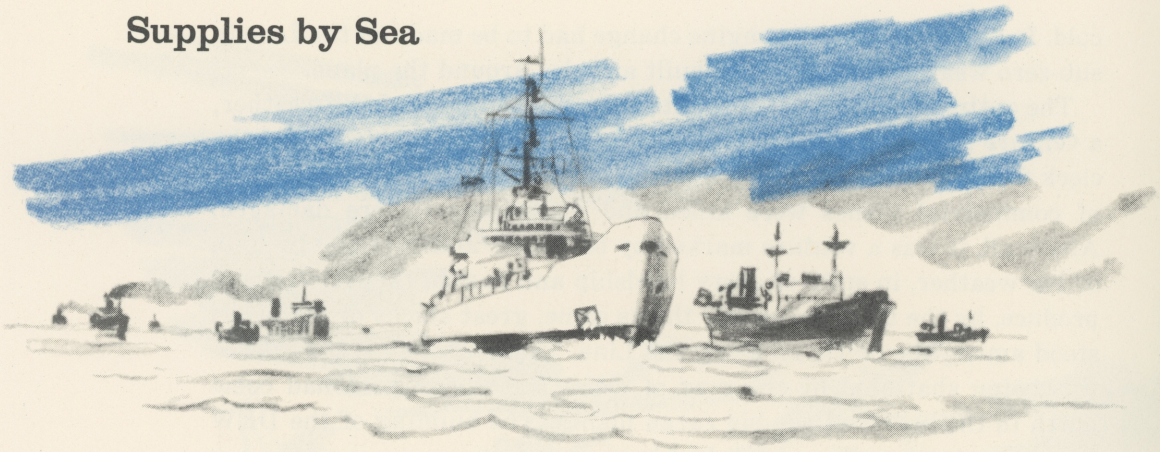
The airlift required thousands of flights by Air Force planes of the United States and Canada, as well as commercial aircraft. Many of these flights were made under "impossible" conditions of profound cold, wind, fog and snow. Every available cargo plane of every type and size was called upon for the job. Some of them, coming all the way from the tropics, weren't winterized for Arctic flying, thus complicating the maintenance problem. There simply weren't any maintenance facilities along the Line and only the sketchiest of facilities where the planes were based. All repairs and servicing had to be done outdoors in the

cold. In one case, when an engine change had to be made on the Line in sub-zero weather, the Eskimos built an igloo around the plane.

The entire airlift was a constant race against time and the weather, a venture involving long, exhausting hours of flying; work around the clock for ground crews. There was tragedy, too. Six pilots and co-pilots of commercial planes were killed and many planes were damaged. Above all, it was a venture marked by brilliance and courage. In spite of the weather, in spite of every hardship and hazard the Arctic could produce, by the time the spring thaws came, great stacks of materials stood among the drifts all along the Line. The awesome Arctic silence was being shattered by the roar of great machines which had come north in the bellies of the big cargo planes. The building of the DEW Line was starting. The airlift had been a success.



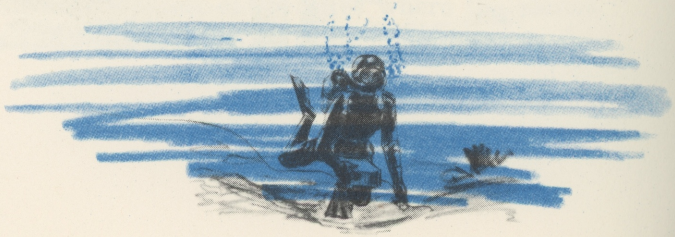
Supplies by Sea



Early in July two great fleets of ships—one at Seattle and one at Halifax—headed out and swung their bows northward, toward the mists and ice floes of the northern seas. The sealift had begun.

Each fleet had a complement of about 60 ships—ice breakers, tugs, repair vessels, victory ships, LST's and many other craft large and small. It was an impressive sight as the deep-laden, gray hulls headed toward the horizon; a sight reminiscent of World War II days. It was a gratifying sight to the men of "Project 572" who for many months had been assembling the thousands of tons of materials in those holds, who got the ships loaded in June, whose single purpose for so long had been to get those ships on their way in time to make the most of the few ice-free weeks in late summer.

To the Navy and Army men aboard those ships, it was a dangerous and difficult mission. The routes they followed in Arctic waters were largely uncharted. They were almost continuously buffeted and harassed by ice, fog and vicious storms. On the western end of the line, ice fields which normally blow offshore in summer, leaving the coast comparatively open, were brought down upon the heavy-laden ships by perverse onshore winds and threatened to crush their hulls against the shore. In other places, Navy demolition experts in rubber "skin divers" suits plunged into the icy water and placed explosive charges on hidden rocks and reefs which had to be removed before cargoes could be landed.

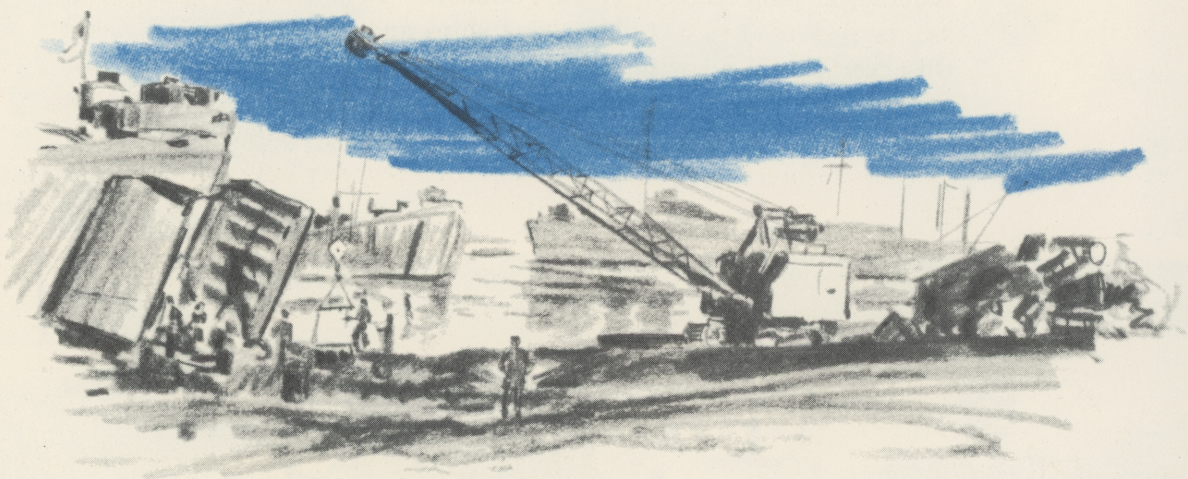


The Arctic Ocean took its toll. A number of ships were damaged. Three of them had to be towed out; two had lost rudders and propellers; one was stove in by ice and its engine room flooded.

Nevertheless "operation sea-lift" was a magnificent performance on the part of the Navy and Army. Not only was all cargo delivered on schedule, but in spite of navigational hazards, almost all of it was delivered to the spots where it was needed. In cases where certain sites simply couldn't be reached from the sea, their share of the materials was left at nearby locations from which they could be hauled in by air or by cat-trains.

All in all, over 200,000 tons of cargo was landed on those northern beaches—an unloading job which required the combined efforts of several thousand U. S. Army troops. Altogether, it represented an incredible mountain of machinery, building materials, food, fuel oil. If the oil drums alone had been laid end to end they would have stretched 180 miles!

And, once again as the Arctic winter settled down everyone on Project 572 could take pride in the fact that the deadlines imposed by the weather and the urgency of the project had been met.



The DEW Line Today

Today, as in the past there is much about the DEW Line which can't be talked about. Details of how and where construction is progressing, dates when it is to be completed and in full operation, are matters which for reasons of national security must remain shrouded in secrecy, along with information on how the equipment works, what it looks like, what it can do.

This, however, *can* be said. In spite of the newness of the DEW Line concept, in spite of all the difficulties imposed by climate and distance —and the hazards which have cost a number of human lives—the project is going well. Most of the work is ahead of schedule and there is every reason to believe it will be finished on time.

Completed, the DEW Line will comprise a row of sentinels which will ceaselessly search the Arctic sky, casting forth into the darkness an invisible but impervious electronic net which no plane can pierce undetected. If enemy planes should ever come, within split seconds that fact will be known in faraway U. S. and Canadian defense centers. Within minutes, the steps necessary to repel the attack and to safeguard civilian populations will be under way.

And the DEW Line does not stand alone. It is tied into an interlocking communications net work with the Mid-Canada and Pine Tree radar warning lines further to the south. It is a vital segment of the outer perimeter of a vast detection system which includes radar stations along both coasts (shortly, offshore "Texas tower" radar sites will be part of it too), radar picket ships and planes and the Ground Observer Corps, all with a common objective: To give us that most precious of commodities in these days of supersonic aircraft and nuclear weapons—time.

All through the winter months the airlift has continued. Not the same vast armada of planes involved in the first airlift, but a constant shuttling back and forth of building materials, food, fuel, men and mail. And when the brief summer comes once more, there will again be other ships threading their way through the ice floes.

The new sites, as they near completion along that faraway coast look, and are, quite different from the first ones built during the experimental days on the Alaskan coast.

In those early days the DEW Line men not only proved that they could build a DEW Line but they learned a lot too—about the equipment and about the Arctic. They found that despite modern machinery and ships and airplanes man is not yet master in this tough, cruel land of extremes. He must adjust his ways to those of the land, yield to the harsh disciplines the Arctic imposes, if he is to live there in comparative comfort and safety.

Convoy, laden with DEW Line supplies,
cuts through the ice floes of Arctic Ocean.

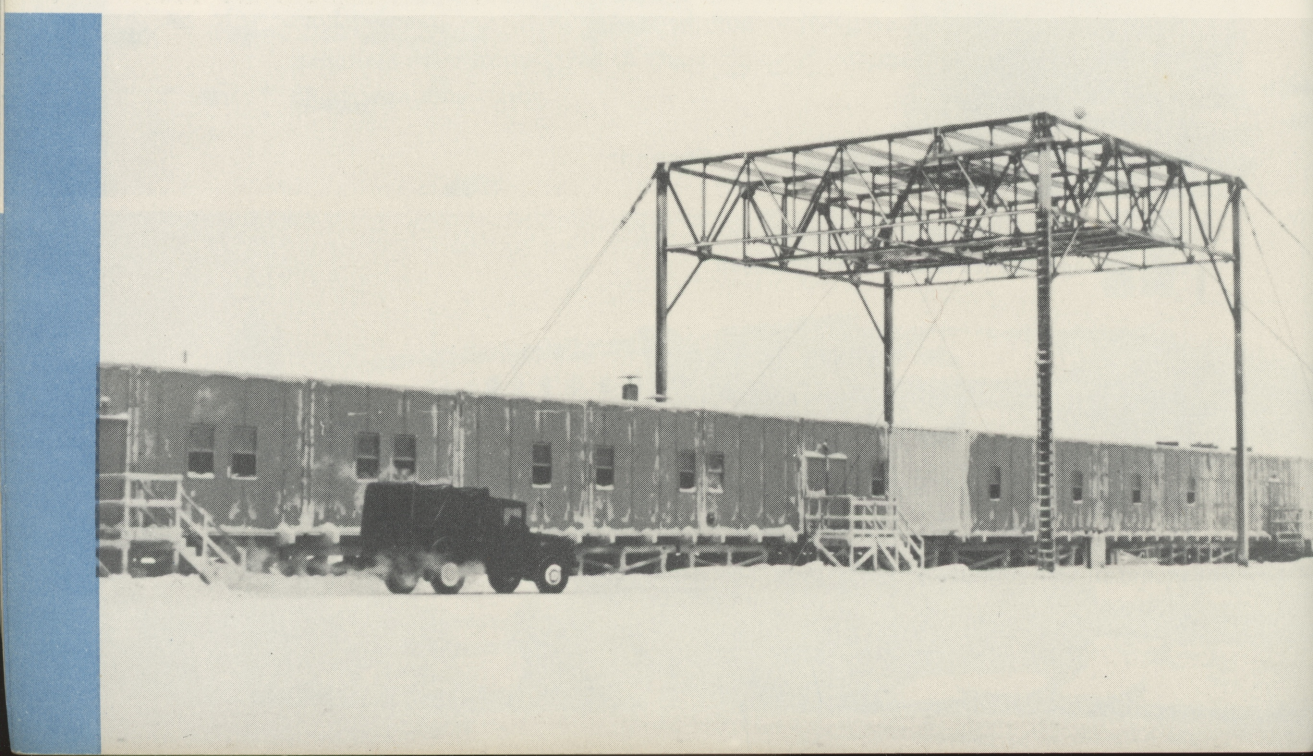
Airlift, one of the world's largest,
brought mountains of supplies to DEW Line.

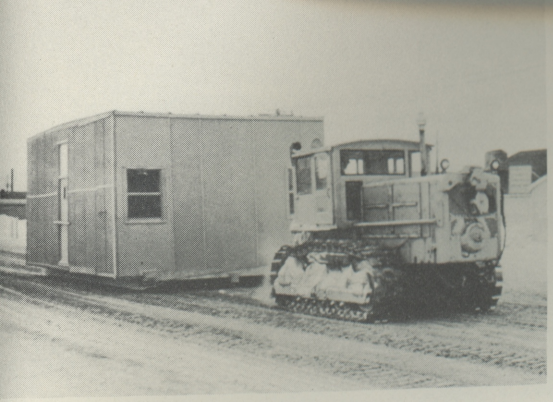
The Modular Building

One way they have adjusted to the Arctic is by developing a special "modular" type of building which reduces construction work in the north to a minimum, makes the most of every available inch of space, conserves heat, simplifies transportation problems and has many other advantages for Arctic living.

The basic unit of this type of structure is the "module," a building 16 by 28 feet by 10 feet high. The modules are outwardly identical except for various door and window arrangements. Inside, each building is equipped for its special assignment. Some are filled with electronic equipment. Others house generators, sleeping quarters, kitchens, laundries, everything needed for a group of men living under Arctic conditions, and for their job of maintaining and operating the radars.

All equipment and fixtures in each module are installed according to a standard arrangement. Completed, the modules are mounted on large sleds and hitched together in a "train." These module trains are often hauled hundreds of miles over the ice from bases where they were assembled to their final locations. There they are mounted on foundations prepared in advance by field parties of construction men. Once on their foundations, the spaces between the units are sealed and filled with fire-retarding insulation and the whole train presents a solid barrier





Module, mounted on runners, will be hauled in a "cat-train" to a DEW Line site.

to wind and cold. Life and work go on without interruption inside, no matter how rigorous the weather.

One of the unique features of the modular design is that heat from the generators and from the electronic equipment itself is used to heat the buildings. This reduces the need for oil-fired furnaces thus cutting

Completed module towed from heated assembly tent will take its place on DEW Line.

fuel consumption and, most important of all, reducing the fire hazard which can be a serious problem in the Arctic.

Today, there is a factory on the shores of the Arctic Ocean where the modular units are made on an assembly line basis—and hauled off to the sites by waiting tractors as fast as all the units for a "train" are completed. At the more remote and inaccessable locations there are other factories too, heated plastic tents stretched over huge steel frameworks, where similar but smaller assembly lines are under way.

Finished module building with framework for radar dome.

Aerial view of one of the module assembly areas, showing airstrip in background.

Gravel is vital to DEW Line;
it keeps buildings,
roads, etc. from sinking
into permafrost.

En route to a DEW Line site, these two Eskimos find an Air Force C-119 transport not too comfortable.

In building the sites, the DEW Line men have learned much about the Arctic which wasn't known before. They have become true Arctic experts—they call themselves "Permitelicans," abbreviation for "Permafrost Expert and/or Radician and/or Mechanic and Electroneer Licensed in Cold Arctic North."

They have learned not only what can't be done up there but also what *can*. Now for example, work goes on all winter long. It is often ten times harder to get the same amount of work done in the winter cold and darkness than it would be in summer, but under flood lights and in specially designed shelters, the job keeps moving all the time.

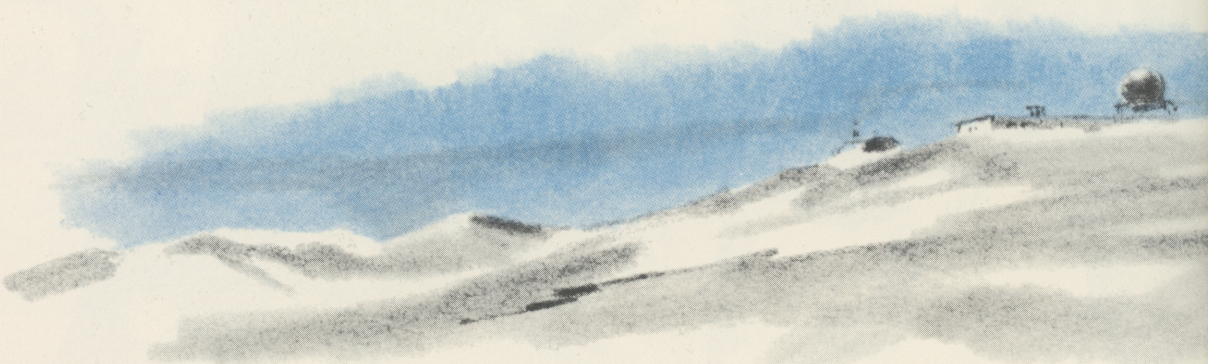
All through the winter months concrete is laid even though thermometer readings are far below zero—something that was impossible a few years ago. And through the winter, too, gravel is scooped out, foundations are put in place, work goes on day after day in all but the most savage weather.

Up there now, doing that job, are men from all over the world. Working side by side are Eskimos, South Africans, Australians. There are

men from Canada, from Europe, Asia and from almost every state in the U. S. They are carpenters, "cat skinners" (tractor and bulldozer operators), electricians, plumbers, radio and radar technicians, riggers, airplane pilots, soldiers, sailors, scientists, engineers.

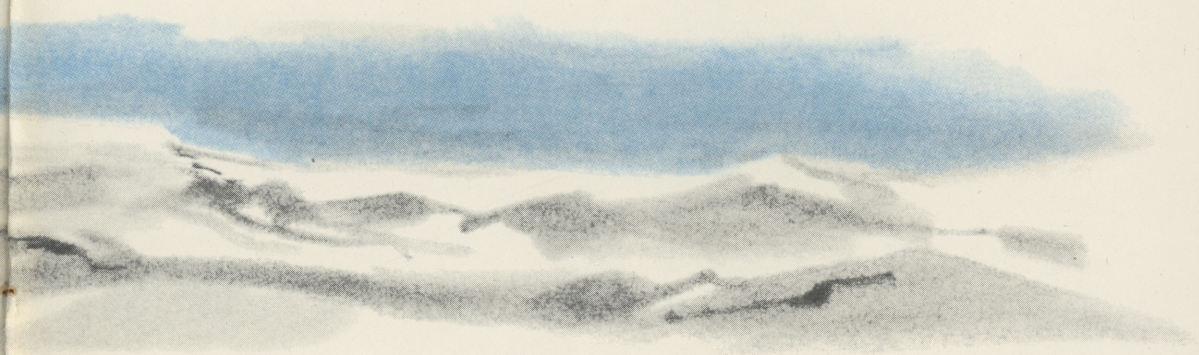
Some of these men of many trades and professions, of varied backgrounds, are employed by W. E.'s subcontracting firms, others are in military service while still others, of course, are Western Electric people, many of the latter transferred in to Western from Bell telephone companies. Yet up on the DEW Line they are all one, a single, closely integrated team, welded together by the sense of the urgency of the job—a feeling that runs strong everywhere on the DEW Line—an *esprit de corps* born of the knowledge there is important, difficult, dangerous work to be done and that they are the ones who can do it.

There is something else, too, these men have in common. Up there in the little, frozen camps half hidden by drifts on the tundra and perched precariously on wind-scoured headlands, these men have opened a new frontier. Though they have come by ship and plane and cat-train instead of the sailing ships and covered wagons of another day, they are as surely pioneers as others of the same sturdy breed who have gone into the forests, across the plains, on to new worlds turning a fresh page of history as they went. Indeed the DEW Line men are doubly pioneers, they have opened new vistas in electronics as well as in geography.



The DEW Line Team

The fact that the DEW Line is today nearing successful completion is due in large measure to the superb cooperation of many people both military and civilian—people of many different skills and professions who have worked together as a single, closely knit team. People of 17 Bell Companies, plus Western Electric and the Bell Telephone Laboratories, have been part of this team. So have the U. S. Air Force, Army, and Navy, the Lincoln Laboratories of M.I.T., the Bell Telephone Co. of Canada and Northern Electric. The principal construction subcontractors—Johnson, Drake and Piper, Inc., Puget Sound Bridge and Dredging Co., Northern Construction Co., Foundation Company of Canada, and J. W. Stewart—have made major contributions as has the Canadian Marconi Co., Northern Transportation Co., and the Maritime Central Airlines. There are many others. Over 2,700 subcontractors and suppliers in Canada and in 17 of the United States have been members of the team. Many of these, 61 per cent of the companies engaged by Western Electric, have been small businesses with less than 500 employees. Although there are far too many of these contributors to the DEW Line to mention here by name, the jobs they have done and are doing are none the less important. Each one can take satisfaction in having contributed valuably to this vital link in our national defense. Without their combined efforts, a project of this scope would have been impossible.



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